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SOCIO-ECONOMIC ISSUES RELATING TO THE SUSTAINABILITY OF THE MAHAWELI UPPER CATCHMENT

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Abstract

The Mahaweli development programme is the largest single investment project ever undertaken in Sri Lanka. The project harnesses water resources of the Mahaweli river basin for electricity generation as well as irrigated agriculture in the downstream areas. While the multipurpose nature of the project gives rise to conflicts of interest between electricity users on the one hand, and the downstream farmers on the other, the presence of a large peasant population in the upper catchment areas (UCA's) has added an additional dimension to the potential and actual conflicts of interest involved. The peasants in the UCA's engaged in rain-fed cultivation rely for their sustenance almost entirely on the intensive cultivation of small plots of land on mountain slopes. The activities of this latter group of peasants contribute to continued soil erosion contributing to siltation of the reservoirs and deforestation in the UCA's adversely affecting the rainfall.

Given the above state of affairs, the future prospects of the project depend to a large extend on how the above conflicts of interest are managed and resolved. The paper is primarily an attempt to outline social and economic circumstances that imping on the sustainability of the resources in the Mahaweli upper catchment areas.

1. Introduction

Accelerated Mahaweli Development programme represents the largest single public investment project in the recent history of Sri Lanka.[1] The project, in the main involves the harnessing of the waters of the Mahaweli river, the largest in the country, for both electricity generation as well as irrigated agriculture. The main investment component of the programme has been the construction of a series of reservoirs in the upstream areas of the river for the purpose of storing

water to be used for electricity generation and crop production in the downstream areas, in the North Central and Eastern Parts of the country.

From an environmental point of view, the most significant feature of the upper catchment area of the Mahaweli river is the presence of a large peasant population there whose livelihood is dependent on the intensive use of land on mountain slopes for the production of subsistence and cash crops. Population pressure on land in these areas has increased over the years due to two main reasons. Firstly, the large tea plantations that were established in the region during the British colonial period (1815-1948) covered large tracts of highland, effectively confining the local peasants to river valleys and marginal land. Secondly, population has increased over the years while there has not been any significant expansion of non-agricultural economic activities (Table 1). These circumstances, in turn have led to the fragmantation of existing peasant land holdings and encroachment on to uncultivated forest land, long protected for ecological and other reasons[2] (Table 2).

Table 1: Population growth in the Mahaweli upper catchment areas ('000).

District	1871	1911	1953	1971	1996
Kandy	232	408	840	1187	1246
Matale	75	108	201	315	415
Nuwara Eliya	58	155	325	450	539
Badulla	129	217	467	615	707
All Island	2400	4104	8098	12690	17017

Source : Census Reports of the Department of Census and Statistics, Colombo.

Table 2: District-wise number & area of operational holdings and the average size of the holdings (1982).

District	Number	%	Area & Acres	%	Average Size in Acres
Colombo	62,250	3.5	65,710	1.9	1.6
Gampaha	170,140	9.5	204,530	5.0	1.20
Kalutara	102,030	5.7	157,220	4.5	1.54
Kandy	107,540	6.0	160,300	4.6	1.49
Matale	50,360	2.8	111,900	3.2	2.22
N' Eliya	38,190	2.1	58,450	1.7	1.53
Galle	116,540	6.5	172,640	4.9	1.48
Matara	96,320	5.3	156,760	4.5	1.62
Hambantota	67,540	3.8	156,070	4.5	2.31
Jaffna	96,770	5.4	103,900	3.0	1.07
Mannar	11,650	0.6	39,950	1.1	3.43
Vavuniya	14,700	0.8	64,290	1.8	4.37
Mullative	10,320	0.6	42,150	1.2	4.08
Batticaloa	46,930	2.6	116,790	3.3	2.49
Ampara	58,890	3.3	131,110	3.7	2.2
Trincomalee	24,040	1.3	89,050	2.5	3.70
Kurunegala	218,220	12.1	529,130	15.1	2.42
Puttalam	67,710	3.8	150,170	4.3	2.22
Anuradhapura	86,440	4.8	258,920	7.4	3.00
Polonnaruwa	32,370	1.8	105,060	3.0	3.24
Badulla	69,620	3.8	120,620	3.6	1.73
Moneragala	46,780	2.6	138,220	4.0	2.95
Ratnapura	106,090	5.9	158,590	4.5	1.63
Kegalle	97,530	5.4	158,590	4.5	1.63
Sri Lanka	1,798970	100.0	3,493,160	100.0	1.94

Source : Agricultural Census, Department of Census and Statistics, Colombo 1982.

In more recent years, the above trends have been reinforced further by certain new developments. Firstly, the demand for high value vegetables grown in these areas, has increased rapidly due to rising incomes of urban consumers, particularly in the Colombo metropolitan region.[3] Expansion of tourism has also been an additional factor in this regard. Secondly, the construction boom that Sri Lanka has experienced in recent years due to state-assisted housing programmes and urbanization has led to an increase in the demand for timber. This has encouraged illicit felling of trees in the upper catchment areas leading to deforestation. (Gunasekara, 1995). Thirdly, the land reform programme implemented by the government in the early seventies, which involved both the nationalization of plantations as well as the alienation of state-owned land to landless peasants for housing and agricultural purposes, also contributed to the intensification of the use of land in the region.[4]

In spite of obvious environmental implications of the above developments, no programme of environmental protection was implemented parallel to the implementation of the MDP. Mahaweli Authority of Sri Lanka (MASL) which oversees the affairs of the Mahaweli Development Programme launched a conservation programme in 1986 in collaboration with several foreign donor agencies. If such a programme was launched from the beginning, certain preventive measures in relation to the above developments would have been taken with a view to minimizing the resulting environmental damage.

2. New Inter-dependencies and Potential Conflicts

As mentioned before, the Mahaweli upper catchment is a region where there is a large population dependent on agricultural sources of income and subsistence. The transition from subsistence production to commercialized agricultural activities over the last several decades has resulted in a significant change in agricultural and land use practices. So, the peasants who grew rice on terraced fields on mountain slopes and valleys have begun to grow high value vegetable crops in response to the rising demand for such produce outside their own region. They also cultivated subsistence-oriented tree crops on home gardens which also

constituted a significant source of food. Both these traditional agricultural practices did not lead to rapid environmental degradation. They, in fact prevented soil erosion. (Clerk, 1994). While soil erosion was minimal, use of agro-chemicals was almost non-existent.

Cultivation practices today are quite different. Commercial cultivation of vegetables and potatoes on mountain slopes with almost no attempts being made to prevent soil erosion leads to constant erosion of the top soil. The response of the farmers to this declining soil fertility has been the heavy use of chemical and organic fertilizers and other agro-chemicals. They can make such heavy investments, at least for the time being, as they grow high value crops for the urban markets.

The transition from the production of subsistence crops to commercial crops is a process which has been underway in most parts of the country for many decades now. The process has been accelerated in recent years by the spread of modern consumption patterns which compel people to earn more and more money. Liberal economic policies pursued by the post-1977 regimes in the country have prepared the ground work for the spread of such consumption patterns.[5]

Population growth, changing agricultural practices and the absence of a comprehensive environmental conservation programme in the Mahaweli Upper Catchment Areas (MUCAs) have made the whole region environmentally fragile. It is already doubtful whether the local agricultural economy could be sustained at its present level of productivity for long. What is equally significant is the fact that the environmental degradation resulting from the above state of affairs has an adverse effect on the sustainability of the Mahaweli system itself. Soil erosion in the Upper Catchment Areas results in the sedimentation of the hydro reservoirs and reduces their capacity. This has a direct impact on their electricity generation capacity. Reduction in the capacity of the reservoirs can also affect the farmers in the downstream areas when the availability of irrigation water is reduced. Reduction in the forest cover in the UCA's may also have an adverse affect on rainfall leading to a reduction in precipitation with significant consequences for agriculture throughout the Mahaweli system. Moreover, power genera-

tion capacity of victoria reservoir has consistently fallen short of its firm potential indicating a substantial reduction in the inflow of water from its catchment area, most probably due to deforestation. (Gunasekara, 1995)

Since the establishment of Upper Mahaweli Environment and Forest Conservation Division in 1986, considerable data has been gathered by researchers on patterns of soil erosion and rates of sedimentation of the major reservoirs. (i.e. CEA, 1986, Stocking 1994, Clerk, 1994) These data clearly points to the fact that soil erosion is highest in areas where commercial cultivation of vegetables on mountain slopes is highly concentrated. Similarly, the reservoirs that are directly affected by widespread soil erosion in their respective catchment areas show the highest rates of sedimentation leading to a rapid decline in the water storage capacity. For instance, Rantambe reservoir has lost 19 per cent of its capacity within four years since impoundment. The upper catchment of this reservoir is an area where seasonal vegetable crops are cultivated on mountain slopes by thousands of small-holding farmers. It is also reported that Polgolla reservoir which was completed in 1976 has lost 40 per cent of its capacity within ten years.

Soil erosion in the catchment areas does not necessarily result in the immediate sedimentation of reservoirs as soil particles washed away are often deposited in the low lying areas such as paddy fields, streams, canals and rivers. So, the actual levels of sedimentation recorded in some reservoirs may not necessarily reveal the extent of soil erosion taking place in a catchment area. This has been demonstrated by field studies undertaken by researchers (Clerk, 1994). The incidence of soil erosion of this nature can also disrupt traditional agricultural activities such as the cultivation of paddy and other food crops which constitute a major source of subsistence for many local inhabitants.

3. Rural Poverty, Environment Protection and the Role of the State

Sri Lanka has experienced minimal rural - urban migration over the last several decades. Though there has been an acceleration of urban growth over the last decade in the Colombo metropolitan region, the

proportion of urban population in the country remains about 22 per cent. The absence of rapid industrialization in its urban areas prevented rural poor from migrating to urban centres. On the other hand, state subsidies of various forms which post - independence regimes consistently sustained made rural living tolerable even for those who lacked productive resources. Alienation of state land through various programmes and the tolerance by the state of land encroachments by the landless encouraged the poor to remain in the countryside.

Given the fact that the state has not been able to solve the problems of high rate of unemployment, under-employment and widespread poverty in the country, political leaders have been compelled to adopt the most convenient approach to deal with the violators of rules and regulations, pertaining to land use, that is, to be tolerant of such violations. This trend has been further reinforced by the fact that some of the violators are themselves leading political activists supporting one political party or another. Moreover, no ruling party in the country since independence has been prepared to curb environmentally unhealthy economic activities of the rural agricultural producers for the fear of losing their support at elections. On the other hand, rural producers themselves have not been able to adopt environmentally friendly agricultural practices either due to lack of investment capital or ignorance or both.

As mentioned before, the accelerated Mahaweli Development Programme is the largest single public investment project implemented in the country in its recent history. Through its extensive network of headworks, downstream storage tanks and canals, it has effectively inter-connected a number of hitherto separate agro-ecological zones with their respective settler populations. While a number of major reservoirs in the upper catchment areas today generate most of the electricity consumed in the country, they also store and supply irrigation water to several hundred thousand small holding farmers in the downstream settlements.

What the above state of affairs points to is that most people in the country are dependent on the Mahaweli system to a greater or lesser extent, either for irrigation water or for electricity or for both. Not all

these people, however are connected with the Mahaweli system in the same manner. For instance, the economic and other activities of the people living in the upper catchment necessarily depend on it for their livelihood. On the other hand, the settlers in the downstream areas are also heavily dependent on the system for their livelihood. For their agricultural activities are dependent on the timely availability of adequate irrigation water from the system. Similarly, electricity users, in particular those who are engaged in industrial employment also rely on the system for their electricity needs.[6] So, the sustainability and the guarantee of the optimum capacity of the system are critical for the well being of several population groups who are scattered over a large geographical area.

The diverse population groups mentioned above are interdependent to a greater or lesser degree depending on the nature of their economic activities as well as their relationship to the Mahaweli system. Yet, in pursuing their diverse livelihoods, they do not necessarily realize how dependent they are on each other. This is largely because each group is preoccupied with its own immediate economic interests. When such interests are threatened, they are likely to put pressure on their political patrons to find a solution. This would naturally lead to political competition among diverse interest groups who are by and large distinct territorial communities. These distinctions are highly significant today as these territorially based interest groups belong to different sub-national political units which compete for national resources on behalf of their respective constituencies.

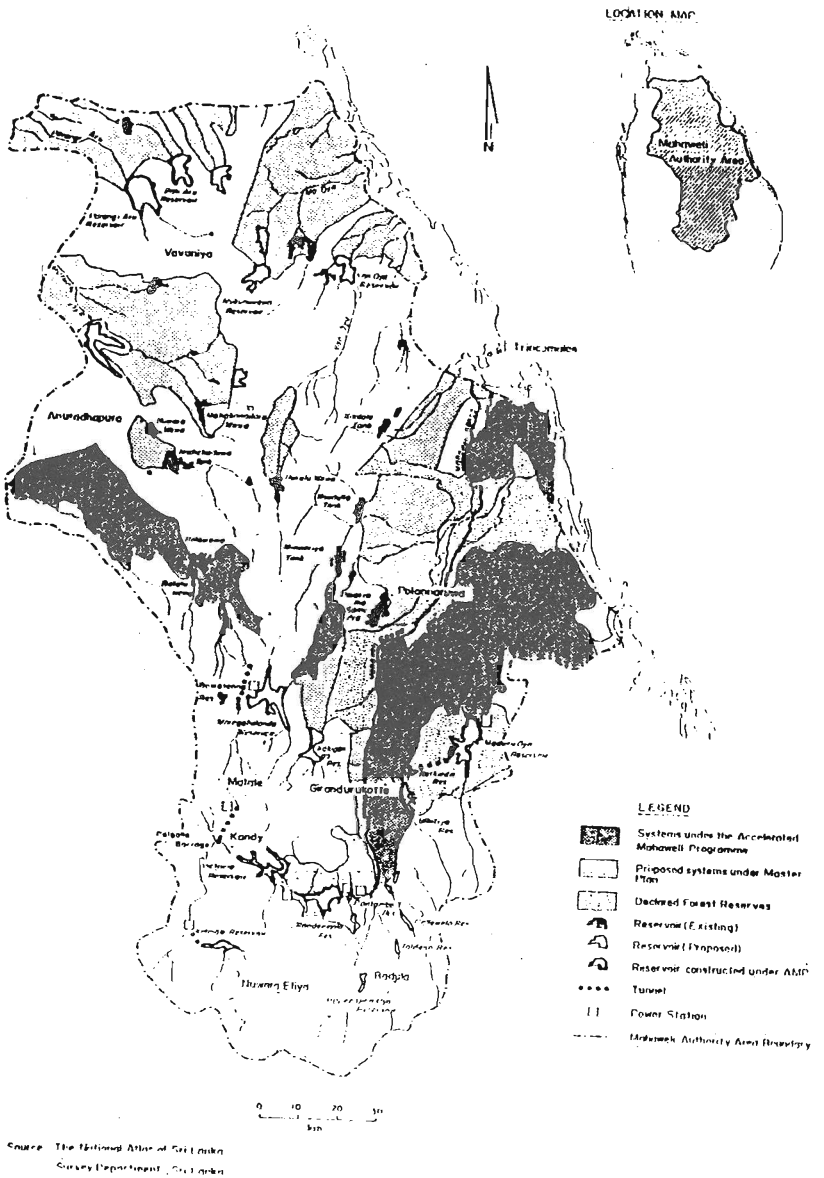
4. Potential Political Conflicts over Economic Interests

The Mahaweli Project area consisting of its upper catchment and the downstream irrigation settlements cut across four sub-national, Provincial Council territories. While the upper catchment area encompasses most of the Central Province and a considerable part of the Uva Province, down stream settlements are located in the North Central and Eastern Provinces (Map 1). Given the inter-provincial nature of the Mahaweli project, its management has not been devolved to the relevant Provincial Councils. Yet, the latter, being responsible for the develop-

ment of their respective areas, would not hesitate to take measures to safeguard the interests of their respective territorial populations. It thus seems reasonable to assume that the devolution of political power to sub-national level, Provincial Councils in the late 1980's has added a new dimension to the latent conflict between territorially-based interest groups competing for productive resources.[7]

Mahaweli Authority of Sri Lanka (MASL) is entrusted with the responsibility of managing the resources of the Mahaweli system which extends over a vast territory cutting across several Provincial boundaries. It is, however unreasonable to assume that it has the capacity to regulate economic and other activities throughout its territory which have a bearing on the sustainability of Mahaweli infrastructure. What this means is that different interest groups inhabitating different areas of the system are likely to pursue their diverse interests with little or no attention being paid to those of other groups. Moreover, political leaders representing different interest groups would want to safeguard the interests of their respective constituencies even at the expense of those of the other groups. As mentioned before, potential conflicts over resources within the Mahaweli system can hardly be underestimated. For instance, if the present economic activities in the upper catchment areas continued unregulated for some more years, water storage capacity of the reservoirs is more than likely to be substantially reduced due to siltation. At the same time, the fertility of the soil in the areas concerned will also be greatly reduced due to continued soil erosion. These changes coupled with reduced local precipitation will reduce the volume of water stored in the major reservoirs leading to a reduction in the capacity to generate electricity and provide irrigation water to down-stream farmers. If the present, high degree of dependence on hydro power is maintained into the future, the conflict of interest between electricity users and downstream irrigators is also likely to become more manifest. Unlike in the Wet Zone of the country,[8] where agriculture depends on year round rainfall, in the down-stream Mahaweli settlements, year round cultivation is possible only with a reliable and adequate supply of irrigation water originating from outside the region.

Map 1
Mahaweli Development Programme



Source: The National Atlas of Sri Lanka
Survey Department, Sri Lanka

Water releases from the upstream reservoirs after generating electricity cannot always be synchronized with the irrigation water requirements of down-stream farmers. Such water requirements tend to increase when the Dry-Zone experiences drought conditions. Irrigation water supply could also be affected by low water levels in the upstream reservoirs caused by inadequate rainfall in the catchment areas. As mentioned before, availability of water for both electricity generation as well as irrigation will also be affected by a reduction in the storage capacity of the upstream reservoirs due to siltation. On the other hand, whether the available irrigation water can be effectively distributed among downstream farmers will depend on the condition of the conveyance system comprising distributary canals and field channels. Due to various circumstances, in most irrigation schemes in the country, water distribution system is poorly maintained and therefore, does not deliver an adequate supply of water to many farmers.

Most rural agricultural producers who cultivate small plots of land do not make a substantial profit. This is due to three main reasons. Firstly, they do not cultivate large extents of land. Secondly, cost of production has increased substantially in recent years due to increasing prices of inputs such as agro-chemicals and labour. Thirdly, agricultural produce market is controlled by whole-sale traders operating from Colombo and the latter keep a large profit margin by acting as middlemen between rural producers and urban consumers. (Hettige and Senanyake 1992)

What is stated above is true for both highland vegetable producers in the Upper Mahaweli catchment areas as well as agricultural producers in the down-stream areas of the Mahaweli system. Relative poverty of a vast majority of these rural producers does not permit them to invest much in environmental conservation measures. In the upper catchment areas, rural cultivators tend to make use of whatever land available to them. It is a common sight in these areas that even steep mountain slopes are cleared and planted with vegetables. Some have removed even traditional, permanent garden crops to make way for seasonal vegetable crops like potatoes. Loss of soil fertility over time is compensated for by heavy use of agro-chemicals which naturally tend to pollute

the water ways with serious health and environmental consequences. Chemical residues washed down by rain get deposited in low-lying areas where many subsistence activities such as rice cultivation and cattle rearing take place. In many areas, loss of livestock due to poisoning is already quite common.

The growing demand for high value vegetables in urban markets has persuaded entrepreneurs with the necessary financial capital to acquire large extents of land in the upper catchment area to grow such vegetables. While some have encroached on to land reserved for conservation purposes, they have been able to overcome resistance from local communities by using their contacts with powerful politicians or officials. Some have acquired land from tea plantations through deals with their management. Such land is cleared of its permanent crops such as shade trees, scrub jungle, tea bushes etc. These clearings are a common sight in the district of Nuwara Eliya where land is scarce and expensive. These commercial cultivators of vegetables are often outsiders to the area and appear to be least concerned about the environmental damage they cause. They seem to be guided more by short-terms gains rather than long-term sustainability of productive resources.

Provision of irrigation water to the settlers in the new settlements of the Mahaweli system as well as outside it has long been considered as part of a package of state assistance granted to poor rural inhabitants. Irrigation infrastructure is built and managed by the relevant state agencies with little or no involvement of its actual beneficiaries, i.e. irrigators. However, given the vast network of regulatory structures and conveyance canals involved, state agencies in charge of the operation and maintenance of irrigation systems do not have adequate material and human resources to keep these systems in good order. The result is the deterioration of the water delivery system over time. So, even when the storage tanks have adequate supplies of water, many farmers cannot have access to an adequate supply of water due to defects in the distribution system.

There has been a significant change in the state policy towards irrigation in recent years, largely under the influence of donor agencies funding rehabilitation work in the irrigation sector. The new policy

stresses the need for user involvement in the operation and maintenance of irrigation systems. It is also widely held that the beneficiaries should not only play a role in running irrigation systems but also contribute materially towards the maintenance of at least the local components of the irrigation infrastructure.

Farmers who are adversely affected by the poor state of irrigation infrastructure have displayed their willingness to get involved and contribute towards its maintenance. Yet, not all beneficiaries are willing to do so, thereby discouraging even those who are willing. Those who experience no water problems and those who resort to illicit tapping tend to keep away as they are unlikely to reap additional benefits from a contribution in terms of time and money. These divergent interests among water users have prevented them from coming forward as a collectivity to take over management and other obligations. An additional factor that discourages many farmers to contribute is the fact that water is only one input, besides several others which are already very expensive and take away most of their agricultural surplus. The fact that the water users have had access to irrigation water free of charge makes them reluctant to pay regular water rates or maintenance costs.

The diversity of interests among water users has impeded the development of strong and cohesive farmer organizations which many state and non-state agencies have attempted to set up in irrigation schemes including Mahaweli settlements. The result is that the farmers have not been able to take over operation and maintenance responsibilities from the relevant state agencies as envisaged under recent programmes of irrigation rehabilitation. In other words, local irrigation infrastructure continues to be poorly managed and maintained leading to water delivery problems.

5. The Need for Sustainable Management of Mahaweli Resources

So far in the present paper, an attempt has been made to identify key interest groups dependent on the resources of the Mahaweli system for their livelihoods. These groups compete with each other to have access to productive resources. The members of each group in general may not

necessarily be aware of the extent and the nature of the competition involved. This would persuade them to be pre-occupied with inter-group competition for resources leading to intra-group rather than inter-group conflict. So, in the down-stream areas, water shortages may lead to conflicts among farmers in their particular locality. Similarly, farmers in the upper catchment areas competing for productive land would be more concerned about the issue as to "who is getting what land for which purpose" rather than the environmental implications of the cultivation of most profitable crops on small plots of land on mountain slopes.

Being pre-occupied with their immediate economic interests, diverse population groups in different parts of the Mahaweli system may not necessarily realize the fact that their future well-being will depend on the long-term sustainability of the Mahaweli resource base. On the other hand, the Central government, in particular its agencies charged with the responsibility of managing the Mahaweli system, can hardly be insensitive to the need for the sustainable management of productive resources within the system. In this regard, the most pressing need is to take all steps needed to ensure the long term viability and stability of the system.

The completed Mahaweli project has now been in operation for over a decade. Research evidence already referred to has raised serious doubts about the long term prospects of the system. In the absence of a comprehensive plan of action in the recent past to arrest the alarming trends, it is futile to expect any significant improvement of the situation in the near future. It is clear that whatever steps taken by the authorities in recent years have had no significant impact on the ground situation which appears to deteriorate unabated. What is urgently needed, therefore is the formulation and implementation of a comprehensive national plan aimed at arresting the present trend. For want of space, no attempt is made here to discuss the scope of such a plan of action. Instead, a few observations are made below with a view to highlighting the essential aspects of any action plan to be implemented.

The growing dependence of an expanding population on productive resources within the Mahaweli system has been a major factor that has contributed to the depletion of the resource base of the Mahaweli

system. This has been largely a product of the unavailability of alternative income sources for the local inhabitants. This is true for farmers in both the upper catchment areas as well as down-stream settlements. So, without restricting such growing dependence, it would not be possible to prevent the gradual depletion of the Mahaweli resource base.

As mentioned before, different interest groups making use of productive resources of the Mahaweli system do not necessarily have a broad out look and therefore, do not perceive the delicate inter-dependencies among them. So, if they were to adopt positive practices, it would be necessary to raise their awareness through educational and information campaigns. Otherwise, they are more than likely to persist with their individual economic pursuits with little or no attention being paid to attendant environmental consequences. What should be emphasized here is that the present cultivation practices of many farmers in the upper catchment areas not only have adverse effects on those living outside their own areas but may eventually undermine their own future well-being.

And finally, every attempt should be made to curb practices which impede the sustainability of the Mahaweli resource base. The steps needed to be taken would include the formulation and effective implementation of rules and regulations, offer of incentives to encourage positive practices, field research to identify and study critical issues and points of intervention, the development, and propagation of sustainable resources conservation measures. Although some small-scale measures in the latter direction have already been taken, there is no evidence yet to suggest their effectiveness and popularity. i.e. Sloping Agricultural land Technology (SALT) introduced by the Upper Mahaweli Watershed Management Project.

Conclusion

Accelerated Mahaweli Development Project has been in operation for well over a decade now. The long term sustainability and viability of the project depend on the efficacy of resource conservation measures adopted by various interest groups inhabiting the project areas. In the absence of a comprehensive resource conservation plan over the last ten years or

so, productive resources within the Mahaweli system have already been considerably depleted. Or at least whatever measures taken have not been able to arrest the disturbing trends. Given the complexity and the vastness of the Mahaweli system, no single line agency could possibly formulate and implement a programme which is effective and comprehensive enough to have a major impact on the ground situation. Therefore, what seems to be needed is a nationally coordinated resource conservation effort involving national agencies, relevant Provincial Councils, NGOs and the people living in different parts of the Mahaweli system.

Notes

1. Original master plan drawn up in the late 1960's to harness Mahaweli water for power generation and irrigated agriculture was intended to be implemented over a period of 30 years. The government which came to power in 1977 took a policy decision to implement a modified version of the programme over a much shorter time period, i.e. 6 years. This latter project eventually came to be known as the Accelerated Mahaweli Development Programme (Muller and Hettige, 1995)

2. Population pressure on land in the rural areas resulted in the fragmentation of existing peasant holdings. The result is that most peasant holdings remain less than one hectare (Table 2).

3. The growing demand for up-country vegetables has a socio-cultural significance as well. The types of vegetables grown in these areas were initially introduced by the British. Many of them still carry their English names like carrot and leeks. These vegetables became highly popular among westernized, urban upper and middle class consumers who adopted western life-styles imitating their English counterparts. It is from such social strata that the consumption of these vegetables spread to other consumer groups throughout the country. Though such distinctions have become rather blurred today, the prestige value of these vegetables continues to influence their prices. Indigenous varieties of vegetables extensively grown

in other parts of the country are also widely consumed but lower in price due to their lower social value. Up-country vegetables are also in great demand in the tourist industry.

4. Sri Lanka has a long history of land reform. The first step in this direction was taken in the late 1930's, even before independence, when the first Land Development Ordinance (LDO) was passed by the legislature. It was intended to address the problem of landlessness among rural inhabitants, a problem caused by both the massive expansion of plantations in the country in the latter half of the 19th century and rapid population growth in the first few decades of the 20th century. Under the Land Development Ordinance, state land was alienated to landless rural families for agricultural and settlement purposes. This process has continued to this day. In the 1950's laws were enacted to give security of tenure to tenants who were identified as an oppressed segment of the rural population. In the early 1970's an extensive programme of land reform was carried out to impose a ceilng on land ownership in the country. Land held by private owners in excess of the ceiling (25 acres in respect of paddy land and 50 acres in respect of highland) was nationalized and brought under the ownership and management of several state institutions established for the purpose. The development of irrigation infrastructure including the Mahaweli Programme has also facilitated the alienation of state land to landless peasants through the establishment of new peasant settlements in the hitherto sparsely populated parts of the country.

5. Post-independence regimes in Sri Lanka till 1977 by and large pursued protectionist economic policies which favoured import substitution production in both agriculture as well as industry. Those policies did not succeed in effecting rapid economic growth required to meet the needs of a growing population in terms of consumer goods and employment. Worsening terms of trade, coupled with the virtual absence of foreign aid, deprived the country of much needed foreign exchange forcing the country to become more and more import substitution-oriented. The results were a shortage of consumer goods, higher rates of unemployment, poor social and economic infrastructure and growing popular resentment. The

regime which came to power in 1977 on a wave of support for reform initiated a package of liberal economic policies and programmes. This package included trade liberalization, removal of exchange controls, incentives for foreign investors, privatization of state enterprises and the encouragement of private enterprise. The new environment became highly conducive for the spread of modern consumerism.

6. This has been amply demonstrated by the fact that from March 1996, the government imposed a daily power cut throughout the country to save energy in response to the rapidly declining water levels in the reservoirs due to inadequate rainfall in the catchment areas. The number of hours of the power cut continued to increase over the next few months soon reaching 8´ hours a day in keeping with the declining water levels. Since no significant rain-fall occurred in the weeks that followed nobody could predict when the authorities could restore normal electricity supplies throughout the country. Meanwhile, production and service activities throughout the country were disrupted due to shortage of power. Daily power cut was imposed in two or three installments during day and night so the industrial factories could not run their normal shifts resulting in a massive loss of production. Though government gave incentives to industrialists to import diesel generators to have their own power supplies during power cuts, many did not respond due to heavy capital outlays involved. Government soon finalized plans to build thermal power stations in the next few years to reduce the country's overwhelming dependence on hydro power, currently around 85 per cent of the installed capacity.

7. The establishment of Provincial Councils in 1987 was an attempt to solve the country's ethnic crisis involving the Tamil community concentrated largely in the North and Eastern provinces. It involved devolution of power to provincial administrations in the country's nine provinces including the North and East. Newly established Provincial Councils have powers to implement development programmes in many fields.

8. Sri Lanka has two broad agro-climatological zones, namely the Wet Zone and the Dry Zone. The Wet Zone comprises the South Western quarter of the island including most of the central hill country. The rest of the country is classified as the Dry Zone. There is also a belt along the boundary separating the two zones, known as the intermediate zone. While the Wet Zone has the benefit of having rainfall during two seasons extending over many months of the year, the Dry Zone receives rain only in one season extending over several months. So, in the Dry zone, year-round cultivation is possible with water stored in numerous artificial lakes built in the region.

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